



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/988,272  | 11/19/2001  | Hirotooshi Kubo      | 981206A             | 8401             |
| 38834   | 7590        | 12/01/2004           | EXAMINER            |                  |
| WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP<br>1250 CONNECTICUT AVENUE, NW<br>SUITE 700<br>WASHINGTON, DC 20036 |             |                      | HOGANS, DAVID L     |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 2813                |                  |

DATE MAILED: 12/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/988,272

Applicant(s)

KUBO ET AL

Examiner

David L. Hogans

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 26 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 12-24 is/are pending in the application.
- 4a) Of the above claim(s) 16-21 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14 and 23 is/are allowed.
- 6) ☒ Claim(s) 12, 13, 15, 22 and 24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

This Office Action is in response to the Request for Continued Examination filed on October 26, 2004.

### ***Status of Claims***

Claims 12-15 and 22-24 are pending. Claims 16-21 are withdrawn. Claims 1-11 are cancelled.

### **EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Stephen G. Adrian on November 24, 2004.

The application has been amended as follows: Claim 14 line 2 after "the" insert "sequential". Therefore, Claim 14 line 2 now reads: "comprising the sequential steps of:".

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 12, 13, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over 5,631,484 to Tsoi et al. in view of 5,795,793 to Kinzer.

#### Claim 12

Tsoi et al., in Figures 2-14 and columns 2-8 lines 30-22, teaches forming a drain layer (28) of a first conduction type (n) on a surface of a semiconductor substrate (27) of the first conduction type (n); forming a first insulating film (33) on said drain layer (28); forming a first conductive layer (34) on said first insulating film (33); forming a second insulating film (37) on said first conductive layer (34); patterning said second insulating film, said first conductive layer, and said first insulating film, to form a gate insulating film (33) from said first insulating film, and a gate electrode (34) from said first conductive layer; implanting an impurity of a second conduction type (p) opposite to the first conduction type into a surface of said drain layer using said gate electrode as a mask, thereby forming a channel region of the second conduction type (47); implanting an impurity of the first conduction type (n) into said channel region with using said gate electrode as a mask, thereby forming an impurity region of the first conduction type (52); forming a third insulating film (56) so as to cover a surface of the impurity region, side walls of said gate insulating film, said gate electrode, and said second insulating film, and an upper face of said second insulating film; etching back said third insulating film to form a side wall insulator (58) of said third insulating film, by maintaining said third insulating film selectively on side walls of said gate insulating film, said gate electrode, and said second insulating film; etching the impurity region (52) to form a recess (66) so

as to penetrate the impurity region, thereby forming a source region (152) of the impurity region; forming a second conductive layer (71) on an entire surface, and patterning said second conductive layer, thereby forming a wiring layer.

Tsoi et al. fails to teach etching back said third insulating film and forming a recess so as to penetrate the impurity region at the same time.

However, Kinzer, in Figures 1-10 and columns 4-6 lines 04-68, teaches etching back said third insulating film and forming a recess so as to penetrate the impurity region at the same time.

It would have been obvious to one of ordinary skill in the art to modify Tsoi et al. by incorporating the etching back of a third insulating film and forming a recess so as to penetrate the impurity region at the same time, as taught by Kinzer, to reduce the number of mask steps for production of the MOS gated device. See column 6 lines 50-60.

Additionally, the specification contains no disclosure of either the critical nature of the claimed process (i.e. – etching recess and third insulating film at the same time) or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen limitations or upon another variable recited in a claim, the Applicant

must show that the chosen limitations are critical. *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990)

Finally, the Examiner construes "at the same time" to mean that no additional process steps are occurring between the etching of the third insulating film and the formation of the recess.

#### Claim 13

Incorporating all arguments of Claim 12 and noting that Tsoi et al., in Figures 2-14 and columns 2-8 lines 30-22, teaches introducing an impurity of the second conduction type (p) into the bottom of the recess to form a body contact region (121) of the second conduction after etching the impurity region prior to forming a second conductive layer (71).

#### Claim 22

Incorporating all arguments of Claim 12 and noting that Tsoi et al., in Figures 2-14 and columns 2-8 lines 30-22, teaches an upper surface and a side surface of the source region are directly contacted with the wiring layer (71).

#### Claim 24

Incorporating all arguments of Claim 12 and noting that Tsoi et al., in Figures 2-14 and columns 2-8 lines 30-22, teaches wherein said third insulating film is formed in one step (56).

4. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over 5,631,484 to Tsoi et al. in view of 5,795,793 to Kinzer, as applied to claim 12 above, and further in view of Applicant's Admitted Prior Art (AAPA).

Incorporating all arguments of Claim 12 and noting that Tsoi et al. and Kinzer fail to explicitly teach a fourth insulating layer formed on the substrate that is patterned so as to remain a peripheral region on the substrate.

However, Applicant's specification, page 2 lines 10-18, discloses a thick oxide that is patterned to be formed in bonding pad site regions (i.e. – on the periphery of the substrate).

It would have been obvious to one of ordinary skill in the art to modify Tsoi et al. and Kinzer by incorporating a fourth insulating layer formed on the substrate that is patterned so as to remain a peripheral region on the substrate, as taught by Applicant's Admitted Prior Art, to create regions for bonding pads.

***Response to Arguments***

5. Applicant's arguments with respect to claims 12, 13, 15 and 22-24 have been considered but are moot in view of the new ground(s) of rejection.

***Allowable Subject Matter***

6. Claims 14 and 23 are allowed.

7. The following is an examiner's statement of reasons for allowance.

The prior art of record fails to teach or suggest, in combination with the other claimed features, etching back the third insulating film to form a side wall insulator after etching the impurity region to form a recess and after forming a body contact region in the bottom of the recess.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Hogans whose telephone number is (571) 272-1691. The examiner can normally be reached on M-F (7:30-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Art Unit: 2813

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DH



**JACK CHEN**  
**PRIMARY EXAMINER**